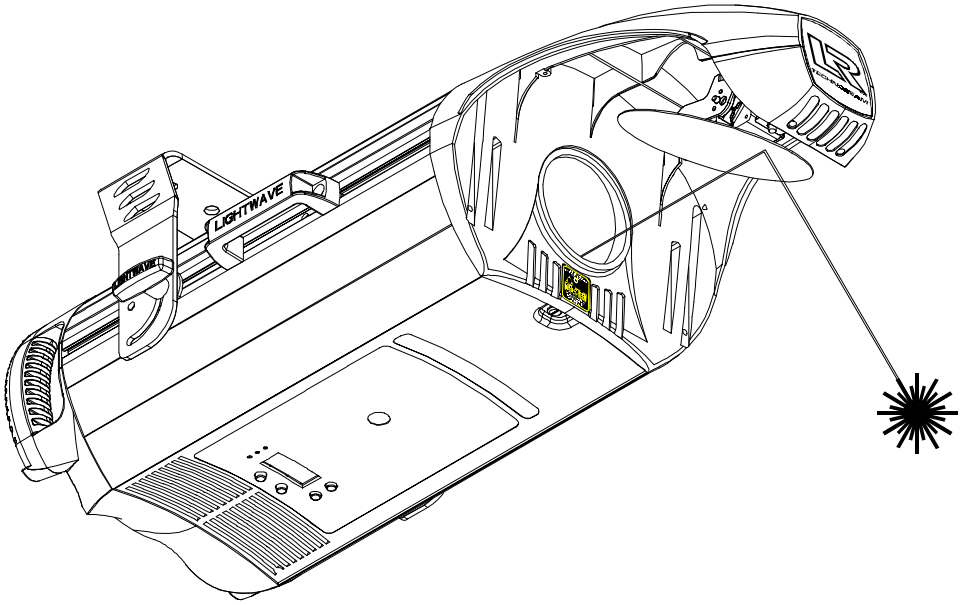
TECHNOBEAM™



Laser Aiming Device™ (LAD™) Addendum

High End Systems, Inc.
2217 West Braker Lane
Austin, TX 78758 U.S.A.

p/n 606001112 Ver 1.0

Limited Warranty

Unless otherwise stated, your product is covered by a two (2) year parts and labor limited warranty. The Laser Aiming Device™ for Technobeam™ is covered by a six (6) month parts and labor limited warranty. Dichroic filters and LithoPatterns® high resolution glass gobos are not guaranteed against breakage or scratches to coating. It is the owner's responsibility to furnish receipts or invoices for verification of purchase, date, and dealer or distributor. If purchase date cannot be provided, date of manufacture will be used to determine warranty period. **This warranty supersedes the warranty in the Technobeam User Manual, p/n 60600105, v1.0 (November 1997).**

Returning an Item Under Warranty for Repair

It is necessary to obtain a Return Material Authorization number (RMA#) from your dealer or point of purchase **BEFORE** any units are returned for repair. The manufacturer will make the final determination as to whether or not the unit is covered by warranty. Lamps are covered by the lamp manufacturer's warranty.

Any Product unit or parts returned to High End Systems must be packaged in a suitable manner to ensure the protection of such Product unit or parts, and such package shall be clearly and prominently marked to indicate that the package contains returned Product units or parts and with a Return Material Authorization (RMA#) number. Accompany all returned Product units or parts with a written explanation of the alleged problem or malfunction.

Please Note: Freight Damage Claims are invalid for fixtures shipped in non-factory boxes and packing materials.

Freight

All shipping will be paid by the purchaser. Items under warranty shall have return shipping paid by the manufacturer only in the Continental United States. **Under no circumstances will freight collect shipments be accepted.** Prepaid shipping does not include rush expediting such as air freight. Air freight can be sent customer collect in the Continental United States.

REPAIR OR REPLACEMENT AS PROVIDED FOR UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. HIGH END SYSTEMS, INC. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO ANY PRODUCT, AND HIGH END SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HIGH END SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGE, INCLUDING LOST PROFITS, SUSTAINED OR INCURRED IN CONNECTION WITH ANY PRODUCT OR CAUSED BY PRODUCT DEFECTS OR THE PARTIAL OR TOTAL FAILURE OF ANY PRODUCT REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, AND WHETHER OR NOT SUCH DAMAGE WERE FORESEEN OF UNFORESEEN.

Warranty is void if the product is misused, damaged, modified in any way, or for unauthorized repairs or parts. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Overview

The Laser Aiming Device (LAD) for the Technobeam™ automated luminaire makes it easy for you to position the mirror during daylight or high ambient light conditions. This in turn allows you the additional flexibility to set up or verify mirror preset positions in conditions that would otherwise make positioning difficult or impossible.

Recommended Laser Operation

The most effective and efficient way to use the laser aiming device is with the fixture's lamp off and dim flags (shutter) closed. There are three reasons for this:

- The higher the temperature, the shorter the life of the laser aiming device. Keeping the lamp off minimizes the temperature inside the fixture, extending the life of the laser.
- The higher the temperature, the less bright the laser will be. If the fixture operates (with the lamp on) at 40˚C (104˚F) for example, laser power will be decreased by about 25%.
- Technobeam was designed so the laser light can exit the fixture with the dim flags (shutters) closed or completely open. At certain intermediate dim flag positions, the laser light might be partially blocked.

Intended Audience

Only qualified and trained employees approved by a laser safety officer should be assigned to install, adjust and operate the laser equipment.

Required Documentation

Before continuing, make sure you have the *Technobeam User Manual*, v1.0 (November 1997)—or later—for important information not contained in this manual.

Using the Laser Aiming Device

You can control the laser using either the fixture's onboard programs, the Technobeam LCD controller, or any DMX 512-compliant controller as shown in the section titled "Controlling the Laser" on page 4.

The laser exits the fixture through the same aperture as the light beam, as shown in Figure 1. Technobeam was designed so that the laser is visible if the dim flags are completely closed or open.

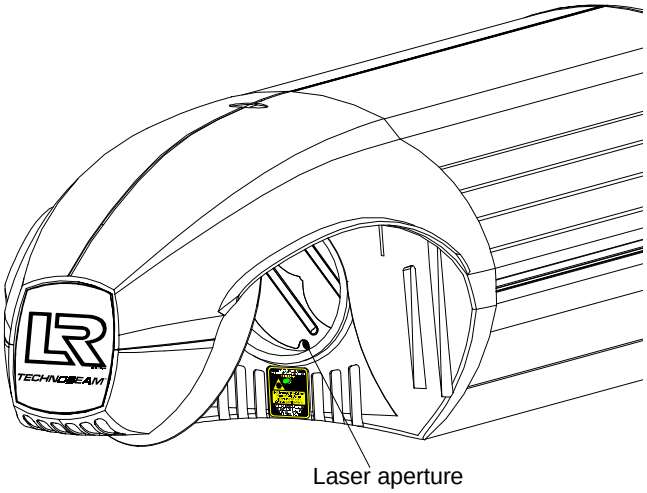


Figure 1. The laser light exits the through the same aperture as the light beam.

The laser should ideally be no more than 2" (5 cm) directly above the center point of a perfectly round light beam, as shown in Figure 2:

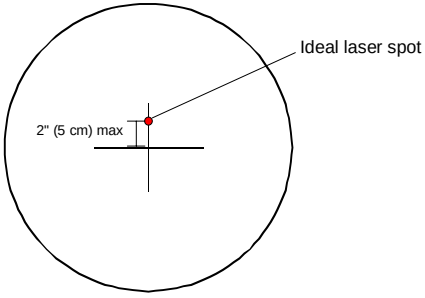


Figure 2. The ideal position of the laser is no more than 2" (5 cm) directly above the center point of a perfectly round light beam.

In its ideal position, the laser path is parallel to the path of the light and will stay 2" (5 cm) above the center point of the beam at any throw

distance or mirror position.

If the laser becomes out of position, you might need to align it as shown in the section titled “Maintenance” on page 8.

Controlling the Laser

You can control the laser in one of three ways:

- **The fixture’s menu system:** Edit one of the fixture’s eight onboard presets (scenes) using the PRST menu as described in the next section.
- **Any DMX 512-compliant controller:** See the section titled “DMX Control of the Laser” on page 4.
- **The Technobeam LCD controller:** See the controller’s user manual.

Menu Control of the Laser

Use the PRST menu to create scenes (presets) including the laser aiming device. You access the LAD using the **MACR** construct from the PRST menu.

The complete list of options controlling the laser aiming device (with the MACR construct) is shown below:

- **LROF**: laser aiming device OFF
- **LRON**: laser aiming device ON continuously
- **LM01 to LM30**: laser modulation levels. **LM01** is “slow” modulation at 4.25 times/sec and **LM30** is “fast” modulation at 255 times/sec.

DMX Control of the Laser

This section explains how to control the laser using a DMX 512-compatible controller.

1. Select a fixture number or DMX start channel for each fixture you wish to control as described in Chapter 2 of the *Technobeam User Manual.*
2. Make sure you select the Technobeam full 18-channel protocol (**TB F** from the Mode menu); otherwise, the laser aiming device will not function.
3. Connect the fixtures to the controller as described in Chapter 2 of the user manual.
4. See Appendix A of the user manual for details of DMX 512 control (channels 17 and 18 in Technobeam full protocol as shown in Table A-1 of the user manual).

Troubleshooting

If laser fails to illuminate, the most likely reasons are lack of power or a failed laser.

Laser gradually loses power

This is normal; over time, the laser will gradually lose power until it finally dims out entirely. If this is happening, contact High End Systems Customer Service in one of the ways shown in “Getting Help” on page 18.

Laser is out of position

Align the laser as shown in the section titled “Maintenance” on page 8.

Emission Indicator LED OFF, Laser OFF

The laser circuit board is not receiving power. The Emission Indicator LED is shown in Figure 3:

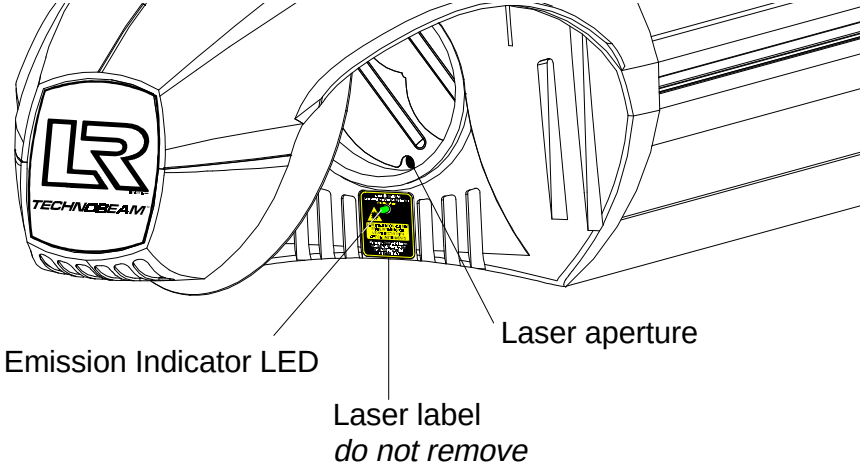


Figure 3. Location of the laser aperture, required laser label and Emission Indicator LED.

1. Unplug the fixture and remove the access door shown in Figure 4:

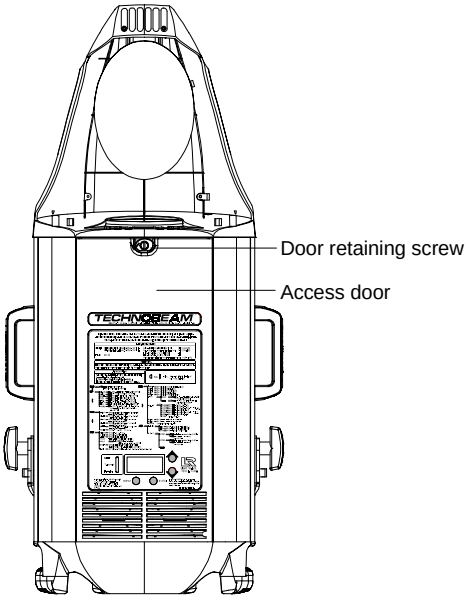


Figure 4. Removing the access door.

2. Check all wiring connections shown in Figure 5:

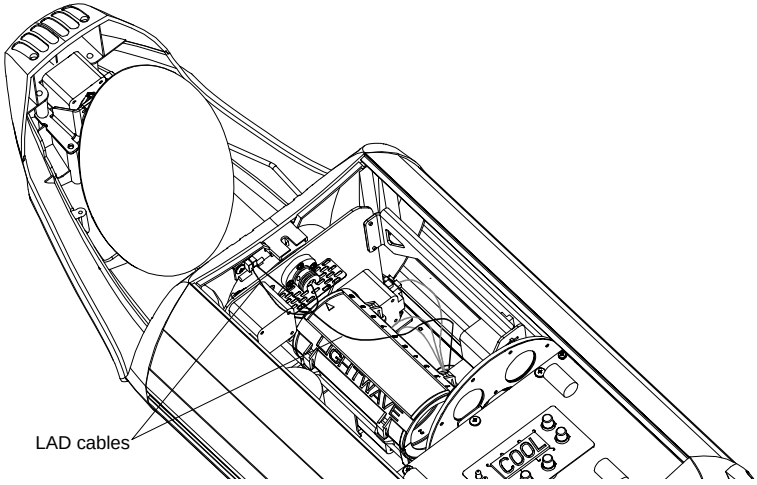


Figure 5. LAD wiring connections.

3. Check to make sure the cable labeled “LAD” is connected to the main circuit board (with the LED display).
4. Replace the access door, plug the fixture in and make sure you have enabled the laser as shown in the section titled “Controlling the Laser”

on page 4.

5. If the Emission Indicator LED and laser are both still OFF, contact High End Systems Customer Service in one of the ways shown in “Getting Help” on page 18.

Emission Indicator LED ON, Laser OFF

1. The laser aiming device assembly is not receiving power. Check the connection at the laser aiming device circuit board, shown in Figure 6. The Emission Indicator LED is shown in Figure 3 on page 5.

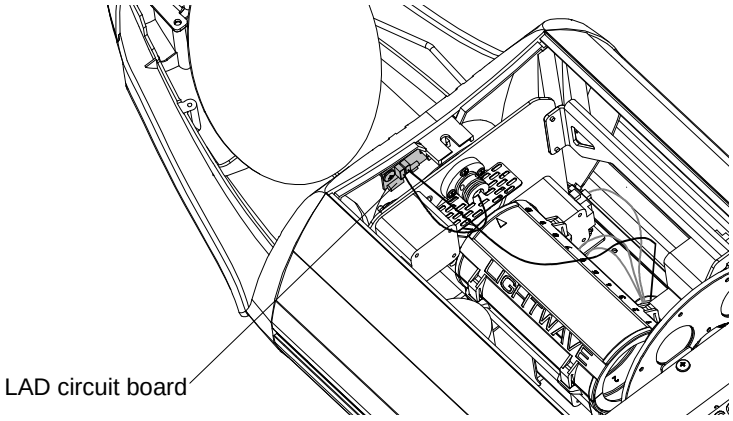


Figure 6. The laser aiming device circuit board.

2. If the cable connections are good, contact High End Systems Customer Service in one of the ways shown in “Getting Help” on page 18.

Laser ON, Emission Indicator LED OFF

The most likely reason is a faulty Emission Indicator LED. Contact High End Systems Customer Service as shown in “Getting Help” on page 18.

Maintenance

WARNINGS

Before performing any service or maintenance, make note of the following:

(1) Hot lamp may be an explosion hazard. Do not open for 5 minutes after switching off. Wear eye and hand protection when re-lamping.

(2) Equipment surfaces may reach temperatures up to 70° C (158° F). Allow 5 minutes for cooling before handling.

(3) Disconnect power before re-lamping or servicing.

(4) Never look directly at the lamp while lamp is on.

(6) The procedures in this addendum are intended to assist qualified service personnel because Technobeam fixtures are to be serviced by qualified service personnel ***only*****.**

Live Components

You will be accessing live components and adjusting the laser in the next section. Take special care to avoid contacting high-voltage live components, located in the area of the main circuit board, shown in Figure 7.

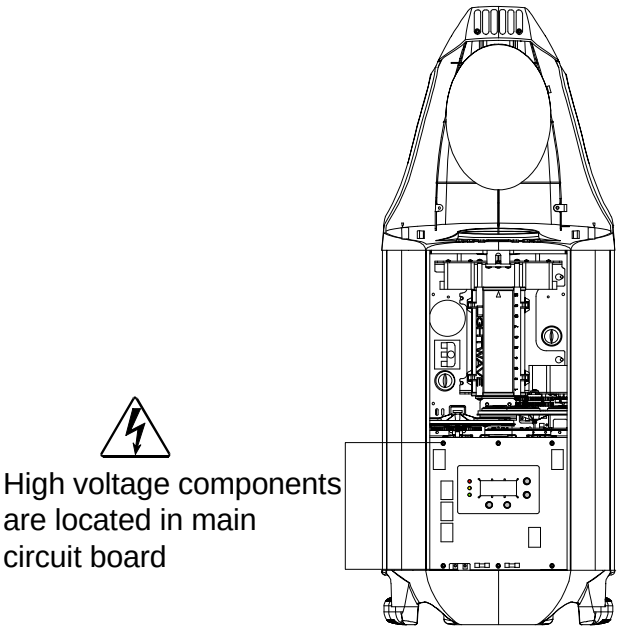


Figure 7. High-voltage component location.

When you activate the laser, observe the following precaution:

Caution **Do not stare into the beam or view it directly with optical instruments. Avoid accidental exposure to laser radiation.**

You must also observe the cautions in the section titled “Safety Precautions” on page 16.

Introduction

You might need to realign the laser periodically in order to maintain its optimal position—no more than 2” (5 cm) directly above the center point of the light beam. If you align the laser in this way, the path of the laser is parallel to the path of the light and will stay 2” (5 cm) above the center point of the beam at any throw distance or mirror position.

However, the decision of whether or not to align the laser is entirely up to you. If the laser strays from its optimal position, but it gives you enough accuracy for your needs, you do not *have to* align it.

Figure 8 shows the ideal position of the laser from the center of a

perfectly round light beam:

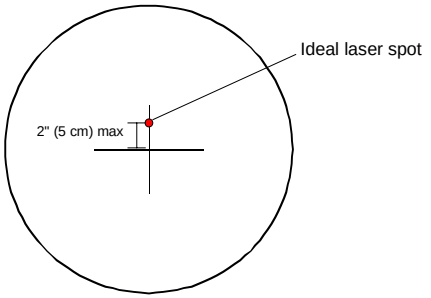


Figure 8. The ideal position of the laser is no more than 2" (5 cm) directly above the center of a perfectly round light beam.

Alignment Procedure

The alignment procedure that follows takes advantage of Technobeam's built-in program storage capability to turn the laser ON.

1. Follow the instructions in Chapter 1 of the user manual to select a voltage setting and install a power cord cap, if you have not already done so.
2. Physically orient the fixture as shown in Figure 9 (the farther away the wall is, the more accurate your positioning will be):

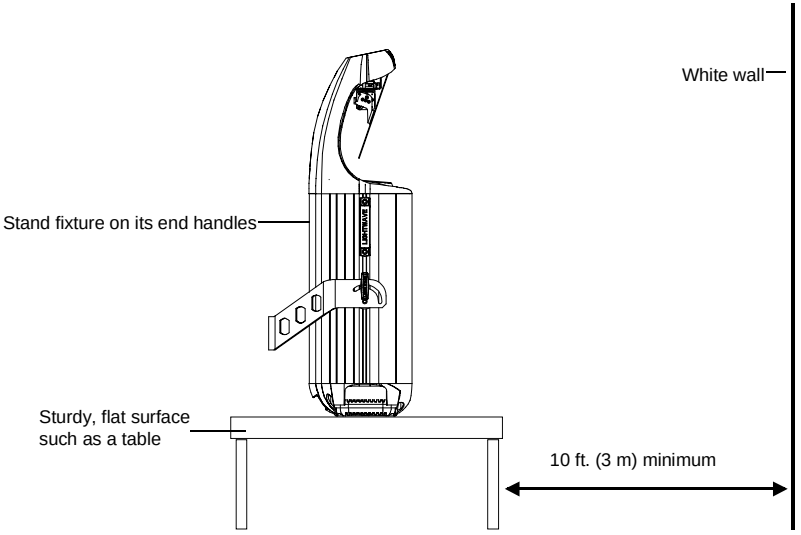


Figure 9. Orient the fixture directly facing a wall no less than 10 ft. (3 m) away.

3. Connect the fixture to an appropriately-rated power outlet. You will

hear sounds as wheels and motors seek their home positions; *this is normal*.

4. When the fixture has finished homing, press and hold the <Menu> key until the LED display reads **ADDR**.

   The next steps show how to turn the lamp ON.

5. Use the <Up> and <Down> arrow keys to navigate to the **TEST** menu.

6. Press <Enter>, then use the <Up> and <Down> arrow keys to navigate to the **LAMP** option.
7. Press <Enter>, then use the <Up> and <Down> arrow keys to select a value of **ON**.
8. Press <Enter>; the lamp should now be on (although you will not be able to tell if the dim flags are closed).

   The next steps show you how to access the fixture's built-in programming menu to begin aligning the laser.

9. Keep pressing the <Menu> key until the **ADDR** menu is displayed.

10. Use the <Up> and <Down> arrow keys to navigate to the **PRST** menu.

11. Press <Enter>, then use the <Up> and <Down> arrow keys to navigate to the **EDIT** menu option. The EDIT option allows you to create or edit up to eight scenes which are stored in the fixture's onboard memory.

12. Press <Enter>. Use the <Up> and <Down> arrow keys to select the scene number of an unprogrammed scene. For example, selecting **SCN2** means you will edit scene number 2.
13. Press <Enter> to begin editing the scene you selected.
14. If you selected an unprogrammed scene, skip to Step 17 now; otherwise, continue with the next step. If the fixture started making noises of gears and wheels moving as soon as you selected the scene, and the noises continue for more than a brief period of time, you selected a programmed scene.

    The next two steps show how to unprogram a scene; you need to unprogram the scene in order to make sure all constructs are set to default values. This is necessary only if all eight scenes are already programmed.

15. Use the <Up> and <Down> arrow keys to navigate to the **ZERO** option.
16. Press <Enter>; you will be required to confirm the action by pressing <Enter> again.

    Step 17 through Step 22 shows how to open the shutter and set the dim construct to full bright. You can skip these steps if you can clearly see the light projected onto the wall.

17. Use the <Up> and <Down> arrow keys to navigate to the **SHUT** option.
18. Press <Enter>, then use the <Up> and <Down> arrow keys to select a

value of **OPEN**.

19. Press <Enter> to accept your selection.

20. Use the <Up> and <Down> arrow keys to navigate to the **DIM** option.
21. Press <Enter>, then use the <Up> and <Down> arrow keys to select a value of **D255** (full bright).
22. Press <Enter> to accept your selection.

    You should now see the white, round shape of the beam projected onto the wall or white surface.

    - If the beam is round (not oval) in shape, continue with Step 31.
    - If the beam is not round in shape, see the next step.

23. Make sure the fixture is oriented directly at the wall, not at an angle. If the fixture is at an angle to the wall, it might be impossible to align the laser properly.

24. Use the <Up> and <Down> arrow keys to navigate to the **TILT** option.
25. Press <Enter>, then use the <Up> and <Down> arrow keys to adjust the mirror position until the beam is round.
26. Press <Enter> to accept your selection for TILT.

27. If the beam needs further adjustment, use the <Up> and <Down> arrow keys to navigate to the **PAN** option.
28. Press <Enter>, then use the <Up> and <Down> arrow keys to adjust the mirror position.
29. Press <Enter> to accept your selection for PAN.
30. Continue adjusting the mirror using PAN and TILT until the beam is as round as possible.

    If you cannot see the beam at all, the lamp might be off. Select **LAMP** from the Test menu and make sure a value of **ON** is displayed; see Step 5 through Step 8. (If the lamp still does not come on, wait a few minutes and try again.)

31. Use the <Up> and <Down> arrow keys to navigate to the **FCUS** option.
32. Press <Enter>, then use the <Up> and <Down> arrow keys to focus on the edge of the beam until it is sharp.
33. Continue moving the fixture and focusing on the edge of the beam until the beam is as round as possible, and sharply in focus.
34. When you have focused the beam, press <Enter>.

35. Find the approximate center of the beam using either a tape measure, ruler or a piece of string, as shown in Figure 10.

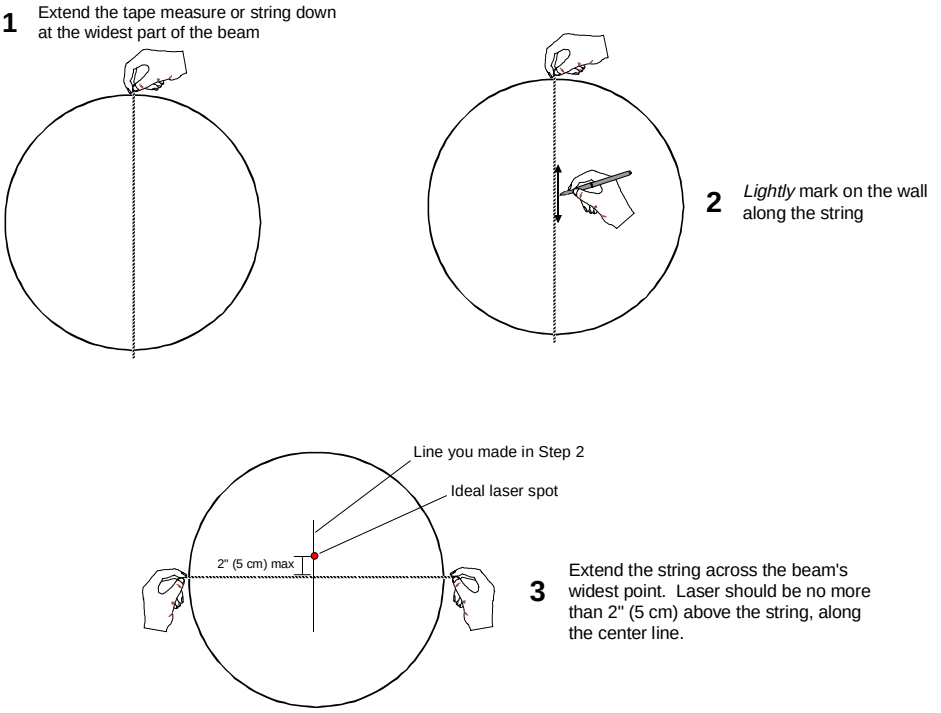

1
Extend the tape measure or string down at the widest part of the beam
2
Lightly mark on the wall along the string
Line you made in Step 2
Ideal laser spot
2" (5 cm) max
3
Extend the string across the beam's widest point. Laser should be no more than 2" (5 cm) above the string, along the center line.

Figure 10. Locating the center point of the projected light beam. The laser should be no more than 2" (5 cm) above the center.

36. Once you have marked the center point of the beam, keep pressing the <Menu> key until the **ADDR** option is displayed.

37. Use the <Up> and <Down> arrow keys to navigate to the **TEST** menu.

38. Press <Enter>, then use the <Up> and <Down> arrow keys to navigate to the **LAMP** option.
39. Press <Enter>, then select a value of **OFF**.
40. Press <Enter>. The lamp now shuts off.
41. Keep pressing the <Menu> key until the **ADDR** option is displayed.
42. Use the <Up> and <Down> arrow keys to navigate to the **PRST** menu.
43. Use the <Up> and <Down> arrow keys to navigate to the **EDIT** option.
44. Press <Enter>, then use <Up> and <Down> arrow keys to navigate to the **SCN2** option (this selects scene number 2; select the same scene you selected in Step 12.

Caution **Do not stare into the laser beam or view it directly with optical instruments.**

45. Press <Enter>, then use the <Up> and <Down> arrow keys to navigate to the **MACR** option.

46. Press <Enter>, then use the <Up> and <Down> arrow keys to select **LRON** (laser on continuously).
47. Press <Enter> to accept your selection.
48. Look at the wall where the beam is projected onto to determine if the laser is on.
49. If the laser does not come on, see the section titled "Troubleshooting" on page 5; otherwise, continue with the next step.
50. Figure 11 shows the 3 mounting/alignment screws located on the laser aiming device assembly. See the instructions that follow the drawing.

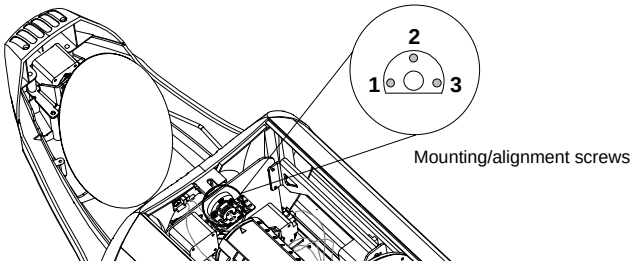


Figure 11. The laser aiming device assembly has three screws that can be used to adjust the position of the laser.

Alignment screws 1 and 3 (shown in Figure 11) move the laser horizontally, and screw 2 moves the laser vertically. Use the three alignment screws to adjust the position of the laser so that it is no more than 2" (5 cm) directly above the center point of the beam, shown in Figure 2 on page 3.

51. After you tighten/loosen each screw, release pressure from the screwdriver before looking at the laser position on the wall; having pressure on the screw can change the laser's position. *Do not force the screws or fully tighten them because the ends of the screws might interfere with the dim flags.*

Hint: If you have difficulty aligning the laser or turning the screws, loosen all three screws and start over.

52. Continue repeating the procedure until the laser is aligned. (If you cannot get your laser exactly at position shown in Figure 8 on page 10, but it is still at a position you think will give you enough accuracy for your needs, you are finished.)
53. When you're finished, replace the access door shown in Figure 4 on page 6.

Specifications

Class 3a laser product

Beam divergence angle: 0.2mRad to 0.3mRad

Maximum output (continuous): 5mW at 630-650nm

Maximum output (pulsed): <2.5mW

Pulse modulation: 4.25Hz to 255Hz @ 50% duty cycle

Pulse duration: 1.96ms to 117ms

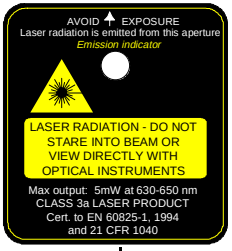
Pulse energy: 9.8µJ to 585µJ

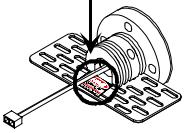
Safety Standards

EN60825-1, 1994

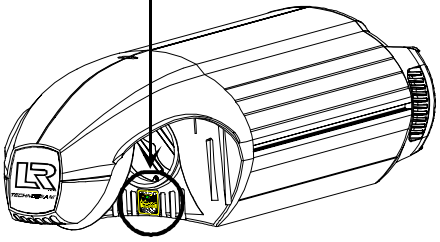
21 CFR 1040

CE


AVOID EXPOSURE
Laser radiation is emitted from this aperture
Emission indicator
LASER RADIATION - DO NOT
STARE INTO BEAM OR
VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS
Max output: 5mW at 630-650 nm
CLASS 3a LASER PRODUCT
Cert. to EN 60825-1, 1994
and 21 CFR 1040



Laser aiming device assembly
(inside fixture)



Safety Precautions

1. CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
2. Using the Laser Aiming Device with any fixture other than Technobeam may result in damage to both the laser and the fixture as well as exposure to laser radiation.
3. Do not point the laser at an audience.
4. Precautions should be taken to ensure that the laser beam is not unintentionally directed at mirror-like (specular) surfaces (most importantly, at flat mirror-like surfaces).
5. Only qualified and trained employees approved by a laser safety officer should be assigned to install, adjust and operate the laser equipment.
6. When not in use, the laser (fixture) should be stored in a location where unauthorized personnel cannot gain access.
7. *Do not remove* the label shown in Figure 3 on page 5.
8. Areas in which this product is used should be posted with a standard laser warning sign.
9. Do not stare directly into the beam and do not view the beam with optical instruments.
10. The laser path should be located well above or below eye level.
11. The laser beam should be terminated at the end of its useful path.
12. Consult local and state laws regarding laser use and possible registration requirements.

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45104

Manufacturer's name:	Lightwave Research
Manufacturer's address:	2217 West Braker Lane Austin, Texas 78758 U.S.A.
Distributor's name:	High End Systems Inc.
Distributor's address:	2217 West Braker Lane Austin, Texas 78758 U.S.A.

Declares that the product

Product Name:	Laser Aiming Device
Product Number:	Laser Aiming Device
Product Options:	All

conforms to the following EEC directives:

73/23/EEC, as amended by 93/68/EEC
89/336/EEC, as amended by 92/31/EEC and 93/68/EEC

Equipment referred to in this declaration of conformity first manufactured in 1998 in compliance with the following standards:

Safety:	EN 60825-1, 1994
EMC:	EN 55022, Class A ITE IEC 801-2, 1991 Level 2 (4/8 kV) IEC 801-3, Draft 5 Level 2 (3 V/m) IEC 801-4, 1988 Level 2 (1 kV/0.5 kV)

U.S.A., February 5, 1998
Kenneth Stuart Hansen, Compliance Engineer

Getting Help

U.S., the Americas and Europe	Service address: 2227 West Braker Lane Austin, TX 78758 U.S.A. From 8 a.m. to 6 p.m. (U.S. Central time) Monday through Friday: (800) 890-8989 24-hour FAX: (512) 834-9195 24-hour voice mail: (512) 837-3063 or (800) 890-8989 8200 Haskell Avenue Van Nuys, California 91406 Voice: (818) 947-0550 Fax: (818) 908-8975
Singapore	Voice:+65 742 8266 FAX:+65 743 9322
24-hour Customer Service World Wide Web site	http://info.highend.com/service/service.html
High End Systems World Wide Web site	http://www.highend.com